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ORGANIZATIONAL INSTRUCTION

QUALITY ASSURANCE REQUIREMENTS FOR TEST ACTIVITIES

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DOCUMENT HISTORY LOG

Status (Baseline/ Revision/ Canceled)	Document Revision	Effective Date	Description
Baseline		10/29/97	
Revision	A	7/1/99	Changes made to reflect new organization code changes and/or Changes made to reflect new directives renumbering scheme and to incorporate the corrective action of NCR 266
Revision	B	9/21/99	Removal of Appendix A (Acknowledgment Sheet) and associated update to Sections 7, 8, and 10
Revision	C	09/05/02	Format and numbering change to implement requirements of QS-A-001 rev F.
Revision	D	06/13/03	Changes to reflect new organization and organization code changes. Includes the electronic TPS system.
Revision	E	10/1/04	Revised to bring document in compliance with the HQ Rules Review Action (CAITS: 04-DA01-0387). Changes were also made to reflect S&MA organizational name changes (i.e., QS to QD).

QUALTIY ASSURANCE REQUIREMENTS FOR TEST ACTIVITIES

1. SCOPE

1.1 Scope. To provide requirements and guidelines for surveillance of in-house certification, acceptance, qualification, and selected development test operations. This includes instructions for review and change control of test procedures and work authorizing documents (WAD's), pretest briefings and records control.

1.2 Purpose. This instruction provides detailed requirements and guidelines for S&MA activities during test to meet MPR 8730.1

1.3 Applicability. This procedure is applicable to all S&MA personnel responsible for the activities associated with monitoring and maintaining surveillance of facility activation, operation, and test and checkout operations.

2. APPLICABLE DOCUMENTS

MPR 8730.1 *Inspection and Testing*

MPR 8730.3 *Control of Nonconforming Product*

MWI 8040.3 *Deviation and Waiver Process, MSFC Program/Project*

3. DEFINITIONS

The following definitions are for terms used in this document.

a. Deviation/Waiver (MSFC Form 847). Deviation/Waiver approval request is used to authorize departures from design drawings/specifications/test requirements per MWI 8040.3.

b. Monitor. Observe at periodic intervals for the purpose of ensuring compliance with requirements or procedures. (Unless specifically required by project, criticality, or MIPs, a procedure may be monitored; also if surveillance has been performed on a previous test run, S&MA personnel may monitor repeat runs).

c. Surveillance. Close and continuous observance for the purpose of ensuring compliance with requirements or procedures.

d. Test Procedure Deviation (MSFC Form 3959). Test Procedure Deviations are typically used to document changes, additions or deletions from the procedure. It cannot be used to change or delete design drawings/specifications/test requirements.

e. Facility Operation Procedure (FOP). Defines the detail sequence of events to prepare and operate a test facility system in support of a TCP.

f. Facility Activation Procedure (FAP). Defines the detail sequence of events to activate and certify test facility systems.

g. Test and Checkout Procedure (TCP)/Marshall TCP (MTCP). Defines the detailed sequence of events to perform a specific test or operation on a test article.

h. Test Preparation Sheet (TPS) (MSFC) Form 248). A multi-copy document or a computer generated document which authorizes and describes test/operation and/or associated manufacturing tasks.

i. Work Authorizing Document (WAD). Any approved document that authorized work or an operation to be performed and is used for the purpose of documenting the actual work/operation performed.

j. Quality Test Preparation Sheet (QTPS) (MSFC Form 248). A multi-copy or electronic (TPS) form used to document anomalous conditions, troubleshooting, facility nonconformances, and test article nonconformances where the MSFC DR System is not imposed.

k. Discrepancy Record (DR). The record of a hardware/ software discrepancy. (MSFC Form 460)

l. Test Discrepancy Record (TDR). The record of problems/anomalies occurring during test operations and the engineering disposition. (MSFC Form 460)

m. Mandatory Inspection Point (MIP). A specific step, sequence, or time in an operation where a characteristic(s) shall be verified, witnessed or performed by Quality Assurance.

n. Squawk Tag (MSFC Tag 6). The squawk tag is used to record, disposition, and certify reinspection acceptance of minor discrepancies (reference MPR 8730.3).

4. INSTRUCTIONS

4.1 Procedure/Work Authorizing Document Reviews (TCP's, FOP's, FAP's, TPS's, etc.). Review shall compare the document with requirements to verify the required tests or operations are performed. In general, test procedure format and content are as shown in developing department OI's. Review the following provisions as applicable:

4.1.1 The detail steps to configure, prepare, calibrate and power up/down the ground support equipment (GSE), control and instrumentation systems and test hardware, including figures, drawings or sketches of GSE and test hardware hookup, or refer to an approved procedure which contains the detailed provisions.

4.1.2 Required values, limits and tolerances for measurements. All design specification or test requirements shall be clearly stated adjacent to actual measurements taken (or measurements should be annotated as engineering information). Data that changes with each test can be left blank; however, the values shall be filled in prior to or during each run of the procedure, per the test request.

4.1.3 Recording the exact identification of the test article.

4.1.4 Appropriate caution and warning notes conspicuously inserted in the procedure preceding critical functions.

4.1.5 When safety critical operations are involved:

a. The Procedure shall be designated as Safety Critical and will require signature from the Industrial Safety Representative.

b. Closing and re-opening the area affected by the critical condition.

c. Environmental sniff checks for hazardous conditions.

d. Use of barriers, security check points, hazard warning signs/lights and placement of standby emergency personnel.

e. Inclusion of oxygen deficiency emergency procedures.

f. Inclusion of ESD control procedures.

4.1.6 A signature block for the test conductor and the Quality Representative to indicate that the test has been completed and the results has been properly documented.

4.1.7 Mandatory Inspection Points (MIP'S) shall be inserted as identified by Quality or the customer during procedure review.

4.1.8 Procedure pen and ink changes or deviations shall be in accordance with developing department OI's.

4.2 TPS Review. Level of review of TPS's as defined by developing department OI's shall include but not be limited to the following:

4.2.1 Initial review verifications:

a. All applicable blocks are filled-in.

b. Applicable documents are attached and identified as an integral part of the TPS.

c. Required signatures present.

d. Ensure inspections called out on the drawing are listed in the TPS steps.

e. Work steps are sufficiently detailed to be thoroughly understood by performing technician and QA personnel.

f. Initial signature by the MSFC Quality representative on the TPS indicates QA is aware of the work to be performed and appropriate MIPs are annotated.

g. Project requirements, experience, judgment and consultation with supervisors and the customer are factors in determining the degree of surveillance/monitoring. MIP's will be inserted during TPS review. For test facilities, refer to applicable drawings, codes, standards and developing department OI's.

4.2.2 Final acceptance (close out) of TPS's shall be as follows:

a. Assure that all work steps are initialed/checked and dated by the performing technician, and accepted by contractor or NASA Quality, independent observer, or engineer where applicable, on the record copy.

b. Verify all MIP's are stamped and dated.

c. Acceptance stamp and date in final acceptance block or stamp and date on the bottom outside corner of the record copy. For the electronic TPS system, sign final acceptance through the password protected system.

NOTE: Prior to close out of any WAD/Procedure, verify all changes (pen and ink, deviations, etc.) have the required initials/signatures and dates.

4.3 Pretest Briefings. Pretest briefings are presented by the test organization according to their developing department OI's, either prior to the initial run of the procedure, in a pretest briefing, introduction to the procedure, or after calling the test team to their stations. Content is typically as follows:

4.3.1 Review of safety critical operations.

4.3.2 Necessary emergency safing procedures.

4.3.3 Procedure changes to include values that change with each test.

4.3.4 Test constraints and open items.

4.3.5 Review/state the rolls, conduct and locations for non-essential personnel.

4.4 Monitor/Surveillance Activity.

4.4.1 Test Monitoring functions shall be as follows:

a. Verify that the test article/test facility is ready prior to test (by review of inspection records, work orders, test records, open items list, etc.). Assure all open items are closed or properly dispositioned as "no constraint to test" before proceeding. For acceptance test of deliverable flight items, ensure that all floor engineering orders (FEO's) are released as engineering orders by contacting the release desk.

NOTE: It is the responsibility of the test engineer/test conductor to determine if there are any open items (except for open FEO's) that are a constraint to beginning or continuing test. The S&MA representative is responsible to determine that there are no open FEO's prior to acceptance tests of deliverable flight items.

b. Verify the procedure approval sheet has the required signatures before allowing the test to proceed.

c. Verify instruments, gages and special test equipment to be used for acceptance/certification are within calibration by review of calibration sticker/recall system.

d. Record or verify the date is recorded on the procedure record copy at the start and completion of test and at the end of each workday. Time entries will be made as required by the procedure.

e. Assure that properly approved deviations/waivers are incorporated in the record copy of the test procedure. Final acceptance will be withheld until this is accomplished.

f. For safety critical tests, verify:

1. That hazard changes are coordinated with all elements (e. g. departments, contractors) of a multi-element test.

2. That individuals directly involved in the testing perform in a professional manner.

3. The declaration of a safe area/environment prior to personnel entry.

4. That the test conductor is aware of initiation of hands on work.

5. That side work during safety critical operation is prohibited.

g. Verify that individuals directly involved in the test maintain order and discipline is not relaxed after test, during shift changes or after hours testing or due to personnel fatigue, schedule pressure, severe weather or pressure of visitors.

h. Verify that turnover briefings are conducted at shift changes for continuity.

i. If a page of the procedure is not complete or additional data is required, the Quality representative shall withhold acceptance stamp from the bottom outside corner of the page and indicate what is incomplete or the data required. (A squawk tag may be prepared if necessary to require the necessary data.)

j. Only applicable portions of the procedure, including the cover sheets, instruction sheets, emergency shutdowns, applicable data sheets and applicable permanent deviations need to be available during a retest.

k. If an entire procedure or sequence is to be re-run, a new copy of the procedure or sequence will be required for the record copy unless additional runs are provided for in the procedure.

l. Quality personnel are authorized to stop work, testing or hardware movement when there is a question of degradation in the level of quality or there is concern for the safety of the personnel or hardware involved. A Squawk Tag may be used to request “Stop Work”.

m. Assure that integrity and configuration of the test article/GSE/facility are maintained at all times. Allow only properly documented and authorized work to be performed on the test article/GSE/facility.

n. Assure that any nonconformance or anomalous condition is properly documented (DR, TDR, QTPS) and the document number recorded in the record copy of the WAD/procedure.

o. Attach the record copy of nonconformance or a withhold tag to the nonconforming article/hardware. All nonconforming hardware will be identified in a manner that does not degrade hardware design or performance.

p. For acceptance tests of end-item hardware (final assemblies), ensure that all floor engineering orders have been released as engineering orders (EO's) prior to test start. End-item acceptance tests can not begin with open EO's.

4.4.2 Work Authorizing Document (WAD) Surveillance shall be performed as follows:

a. Assure all MIP's are witnessed, verified or performed by MSFC Quality, contractor quality, or independent observer/engineer.

b. Assure that the record copy of the WAD/Procedure is physically located at the test or inspection site at the time of test or inspection. For the electronic system, a printed copy is required at the work site. Ensure the printed copy is the latest approved version.

c. If a page of the WAD is not complete or additional data required, the Quality representative will withhold acceptance stamp until the necessary data is supplied.

d. Assure that any nonconformance or anomalous condition is properly documented and the document number recorded in the record copy of the WAD/procedure.

e. Attach the record copy of nonconformance or a withhold tag to the nonconforming article/hardware. All nonconforming hardware will be identified in a manner that does not degrade hardware design or performance.

f. For acceptance of instrumentation, Quality personnel will participate in channelization checkout if required by the project. If not, acceptance of the WAD may be accomplished by verification that the technician/engineer signed off the WAD, indicating channelization/end-to-end checkout was performed and acceptable.

g. Changes or work may be performed without a WAD, only when immediate action is required to reduce or eliminate a hazardous condition; however, a WAD must be prepared after the fact.

h. Appropriate nonconformance documents can be written to document unauthorized work, modifications, parts
replacement, etc.

4.5 Use Of Stamps. Upon satisfactory completion, stamp the WAD/procedure, data sheets, log books, etc. Stamps shall be applied and dates recorded as follows:

4.5.1 To each operation containing a MIP.

4.5.2 To each page monitored on the bottom outside corner.

4.5.3 To the right side of the page, on a horizontal line drawn above or below the first or last sequence monitored, when the Quality representative starts or stops monitoring the test.

4.5.4 To the right side of the page, on a horizontal line drawn below the last sequence performed, when the Quality representative is changed.

4.5.5 If a procedure is interrupted or discontinued prior to completion, the Quality representative or test engineer will draw a line, stamp, date, enter time and annotate "Interrupted" or "Discontinued" and give reason.

4.5.6 Beside each pen and ink change prior to close out of the corner stamp

4.5.7 In the left hand margin, adjacent to the sequence changed by procedure deviation, after verification of the deviation.

4.5.8 For the electronic system, acceptance will be signified through password protected initials and signatures.

4.6 Procedure Changes.

4.6.1 Changes or revisions shall be controlled in accordance with department OI's.

4.6.2 The test conductor shall record, initial and date all pen and ink changes in the record copy of the procedure. The Quality representative shall initial or stamp beside the change.

4.6.3 Testing shall not be unduely delayed for deviation signatures. Verbal approvals over the communication system from required signature parties are adequate until after test completion. However, deviations should be obtained first whenever possible.

4.6.4 Deviations required to reduce an immediate hazard shall be performed immediately upon recognition of the hazard.

4.6.5 Safety related deviations require Safety representative signatures when the hazard level is increased or when a hazard is created.

4.6.6 The Quality representative shall record or verify that the procedure deviation number and date is recorded in the left hand margin of the record copy adjacent to the affected sequence and stamp adjacent to the deviation number.

4.6.7 A sequence of a procedure that is not performed requires a procedure deviation deleting it from the test, except as described in the NOTE below.

4.6.8 The Quality representative shall review each procedure deviation for clarity and completeness. Procedure deviations shall not be used as a substitute for waivers, nonconformance documentation or specification changes.

NOTE: Some test procedures allow the test engineer the option of not performing a step or sequence if it is not required for a particular test run, if the set-up has already been performed during a previous test, and does not need to be re-done, or other similar circumstances. The engineer may write "DNP" (Do Not Perform) or "NA" (Not Applicable) on the step or sequence and initial.

4.7 Procedure Record Copy. The Quality representative shall review the procedure record copy, identify as "Record Copy" if not already identified, sign and forward to the Quality Assurance Records Center or in the Test Area the "Record Copy" of the as-run test procedures shall be maintained in the Test Area according to the developing department OI's, assuring that:

4.7.1 All sequences in the procedure have been completed (or deleted by approved procedure deviation, DNP or NA) and signed by the test engineer/conductor.

4.7.2 All procedure changes have been included in the as-run record copy and approved.

4.7.3 All nonconformance/anomaly reports, are properly dispositioned and annotated in the procedure.

4.7.4 Test article identification has been recorded in the as-run record copy.

4.7.5 Data sheets have been completed and signed by the test engineer/conductor.

4.8 Review Of Test Report. The content and format of the test report is the responsibility of the test engineer and/or customer. Quality review, if required, shall be primarily to determine that no inaccuracies exist and that there are no significant omissions.

5. NOTES

a. When specified by project requirements, Quality Assurance Records Center (QARC) located in building 4705 will maintain as-run test procedures until the project authorizes their destruction.

b. In the Test Area the as-run tests procedures shall be maintained in the Test Area according to the developing department OI's.

6. SAFETY PRECAUTIONS AND WARNING NOTES

None.

7. APPENDICES, DATA, REPORTS, AND FORMS

None.

8. RECORDS

None

9. TOOLS, EQUIPMENT, AND MATERIALS

None.

10. PERSONNEL TRAINING AND CERTIFICATION

None.

11. FLOW DIAGRAM

None.